DOCUMENT RESUME

ED 358 949 PS 021 473

AUTHOR Fowler, William; And Others
TITLE The Long-Term Development of Giftedness and High Competencies in Children Enriched in Language during Infancy.
PUB DATE Feb 93
NOTE 31p.; Paper presented at the Esther Katz Rosen Symposium on the Psychological Development of Gifted Children (Lawrence, KS, February 19-20, 1993).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Child Development; Cognitive Development; Early Experience; *Early Intervention; *Enrichment Activities; Gifted; Home Visits; *Infants; *Language Acquisition; Learning Strategies; Longitudinal Studies; Parent Influence; *Parent Participation; Preschool Education; *Program Effectiveness

ABSTRACT

This paper reports results from two dissertation studies and several pilot and case studies examining the effects of early enrichment on children's language and cognitive development. Early enrichment in these studies included home visits with parents, typically beginning before the child reached 6 months of age, and continuing until the child was about 1 year old. Enrichment methods, combining a cognitive referential learning strategy with a social interaction strategy, were presented to parents in informal discussions, interactive demonstrations with their infants, and a program guide and videotape. Several types of developmental measures were employed, including standardized mental tests, language assessment scales, tape recordings, and daily parent records of infant progress in sound, word, and sentence acquisition. Follow-up measures consisted of parent interviews and SAT measures administered through school. Data analysis compared developmental test norms and actual outcomes with expected probabilities for indices of school achievement and competence. Results indicated that children in all projects progressed in language development well in advance of norms. Results showed that 62 percent of the children are in gifted or advanced programs, and from 56 to 92 percent have high grades, are intellectually independent, are excellent readers and writers, and are skilled in learning languages, math, and science. (MM)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

ED358949

# The Long Term Development of Giftedness and High Competencies in Children Enriched in Language During Infancy

William Fowler, Director
Center for Early Learning and Child Care
Cambridge, MA

Karen Ogston
Private Practice
Ottawa, Ontario
Canada

Gloria Roberts-Fiati
School of Early Childhood Education
Ryerson Polytechnic Institute
Toronto, Ontario
Canada

Amy Swenson
Private Practice
Surge Narrows
British Columbia
Canada

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
William Fowler
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Contact Address:
William Fowler
Center for Early Learning and Child Care
29 Buckingham St.
Cambridge, MA 02138
Phone: (617) 547-4277/547-0910
Fax: (617) 547-0910

Paper Presented at the 1993 Esther Katz Rosen Symposium on the Psychological Development of Gifted Children: Relating Life Span Research to the Development of Gifted Children. University of Kansas, February 19-20, 1993.

PS 021473

## Abstract

Infants are remarkably responsive to variations in the quality of language experiences they encounter in early development. They can easily learn the different components of language, the sounds, words and syntactical dimensions, through short-term learning experiments in the laboratory. Studies in homes and day care reveal how much young children from all educational backgrounds vary in their early linguistic and cognitive competencies according to how well parents and teachers interact with them in using language. There is also a great deal of early intervention research with children from impoverished circumstances underscoring how early cognitive enrichment, heavily concentrated on language, enhances children's language and cognitive skills over the short-term. All of this research, however, suffers from certain limitations.

Short term studies in the laboratory on bits and pieces of language say little about how much experience can shape children's general linguistic and cognitive competencies, even in the short term. Correlations between variations in experience and variations in children's development, suggest that many children may be shortchanged in opportunities to realize their potentials, but correlation studies need verification through systematic educational efforts. And finally the impressive short term enhancement of skills in impoverished young children through systematic educational effort largely fades through their later debilitating experiences in the same poor circumstances to which they are returned once the year or two of special educational effort is terminated.

But what would happen if systematic educational enrichment were attempted with young children living in relatively salutary social and economic circumstances? The study reported on today has attempted to do just that. The original educational effort undertook to provide cognitive enrichment during infancy to children from generally stable but diverse socioeconomic, educational and ethnic backgrounds. The data presented here furnish expanded long term follow-up information on 39 of 44 children whose largely college educated parents were successfully guided in enriching their children's language in cognitively oriented, socially interactive play and child care activities during infancy.

In preliminary results 24 children (62%) are in gifted/advanced programs (compared to an expected 4.8%) and from 22 to 36 (56% to 92%) have high grades, are intellectually independent, excellent readers and writers, and are skilled in learning languages, math and science. Most are also well balanced socially and have diverse interests, including sports and the arts. Girls and boys are about equally well skilled academically, though girls are generally more verbally skilled, while boys are somewhat better in math, though girls are in science. Even more preliminary results on just 6 experimentals and 4 controls of 43 originally early stimulated Ss from largely less than high school graduated, Afro-Carribean immigrant families furnish similar long-term outcomes at somewhat lower levels.

Early enrichment, centering on language, may apparently launch a process of development that equips the child in a supportive ecology to maintain an expanding process of cognitive learning and development across a broad range of cognitive and social skills enabling higher proportions of children than expected to realize their potentials.

# The Long-term Development of Giftedness and High Competencies in Children Enriched in Language During Infancy[1]

What effects does early enrichment in language have upon development? Does it promote competence in language alone and only for a certain period? Or does early enrichment, focused on language, bring about effects that are both more general in their influence on cognitive skills and longer lasting? Are effects limited to cognitive development or do they impact on the development of social skills and motivation as well and if so in what way? Is the result reclusive, socially unbalanced individuals with a narrow set of high powered cognitive skills? Or can what might be called attempts to engineer skill development result in development that is socially well balanced, diverse in interests, and independent and creative, as well as high in competence? What are the relative weights of the early and later experiences in contributing to development? And finally, can an early start in language generate competencies in children at what are historically thought of as "gifted" levels? How much do current developmental norms reflect the full realization of biological ability potentials, at all levels, and how much do they reflect culturally patterned forms of cognitive socialization that shortchange opportunities for development high competencies and even giftedness?

These questions fall roughly into three types. (1) How much can early stimulation contribute to development? (2) How potent is language as a mediator of development generally? And (3) how open to alteration are current population norms for giftedness?

To be sure, these questions have already been answered in part by past research, as we have recently reviewed in some detail (Fowler, Ogston, Roberts, and Swenson, in press; 1993). First, a host of past experimental training studies have shown that infants and young children can be readily induced to learn various components of language, including sounds (e.g., Rheingold, Gewirtz and Ross, 1959; Ervin and Miller, 1963), words (e.g., Hamilton, 1977; Strayer, 1930) and syntax (e.g., Cazden, 1965; Nelson, 1977). Young children are, in short, highly responsive to acquiring virtually all dimensions of language under the influence of specific training paradigms. Second, the range of variation in effective language stimulation during the early years among both parents and teachers is very wide, and these variations are highly and significantly correlated with children's verbal and cognitive development (e.g., Carew, 1980; Clarke-Stewart, 1973; Hart and Risley, 1992; McCartney, 1984). Moreover, variations in both parenting quality and child language outcomes are equally large in middle class, well educated families (Huttenlocher, et al, 1991).

---

[1]Acknowledgement: Portions of the data in this paper were presented in a paper entitled Accelerating Language Acquisition at a recent symposium on The Origins and Development of High Ability sponsored by the CIBA Foundation in London on January 25 to 27, 1993.

Third, the great body of early intervention research accumulated from the 1960s, in which programs were heavily loaded with language stimulation, has regularly demonstrated how easily infants and preschool children from poor families with limited formal education can acquire language and cognitive skills well in advance of both controls and developmental norms. Fourth, aside from our own studies to be discussed below, other limited studies (e.g., Metzl, 1980; Drash and Stolberg, 1977, 1979) have suggested how early enrichment might benefit children from middle class, advantaged families, which in the latter studies advanced to gifted levels in language and IQ following some 6 months of parent guidance. Finally, numerous retrospective biographical studies of eminent figures and case studies of high IQ children collected by the senior author (Fowler, 1981; 1986, 1990) have revealed the consistency with which early language oriented cognitive stimulation has been an important staple of early experiences of these individuals. Similar studies reported by Howe (1990), Bloom (1985) and others have reported parallel findings, though development may have a different foundation in certain fields like athletic and musical competence.

Such studies go only so far in answering our questions, however. The experimental studies were conducted in the laboratory and focused only on short-term efforts to learn selected features of language, without regard to the acquisition of language as a total system over extended developmental spans. Correlational research, while certainly suggesting the presence of widely untapped biological potentials for improving linguistic and cognitive skills in large strata of the population, does not of course actually demonstrate whether such potentials exist and how they could be realized if they do. And, unfortunately, in the early intervention research, while certain performance gains in school and the community have lasted into high school and beyond, the earlier high level language and cognitive gains of children have typically receded over the course of later development (Consortium, 1983; Lazar and Darlington, 1982). What we seem to have learned here is that even young children from the poorest backgrounds have a great deal of untapped potential for acquiring complex abstract skills through fairly modest early educational programs seldom lasting more than a year or two. But we have learned little about the long range developmental potentials of these or any other children, given the almost invariable return of children to their impoverished environments upon program termination. At best we can say that early enrichment works for early development, but later experiences also count heavily for later development. A good foundation is hardly a completed building.

In the studies on young advantaged infants, the training in Metzl's (1980) study was extremely brief (3 1 1/2 hour sessions) and the results were unimpressive (generally little more than matching norms for children from this background). In the Drash and Stolberg (1977, 1979) studies the sample size was miniscule (N = 4) and follow up results, while indicating stable high gains, extended only to the preschool period (43 months). Retrospective biographical analyses and case studies are necessarily limited by high selectivity, both in

cases selected (only the successes are chosen) and post hoc analyses (information available is likely to be selected and colored by beliefs in how the successes were attained). Although they offer some of the most compelling and exciting insights on the potentials of early language focused experiences for generating high levels of competencies of all kinds, from play writing and music to scientific discovery and mathematical brilliance, they equally suggest that stimulating enrichment is not limited to the early years. It is a process that must be maintained, and quite intensively, by parents, teachers and other mentors and support systems, along with the child's own interests and motivations, throughout development.

From these collected findings, some conclusions seem justifiable while others are less certain. Among the more justifiable are that language and cognitive abilities can easily be advanced through early enrichment, at least for the short term and that homes and day care vary widely in the quality of language experiences that relate significantly to how children's language and cognitive skills develop. Both conclusions suggest that the possibility of widespread lodes of unmined talent in the culture. These trends also suggest that language plays a central mediational role in cognitive development. Less certain is how important, how central and how lasting enriching early language may be to later development, in all its aspects, both positively and negatively. And, while the ease in advancing early skills beyond developmental norms indicates that norms may be heavily governed by socialization practices that fall short of developing children's underlying cognitive potentials, we do not know by how much, or over what age spans beyond the early years. The retrospective biographical and case study research on the historically eminent and high ability individuals adds another dimension to the equation, but we still have no basis for predicting potentials for giftedness in the general population.

## Systematic Research on the Early and Later Developmental Effects of Early Whole Language Enrichment

In the early 1970s the senior author began a collaboration with a number of students, now his colleagues, designed to explore more systematically just how early enrichment, particularly enrichment concentrated on verbally mediated experiences, might influence development. Several pilot and case studies were undertaken through seminar projects on an original total of 15 infants from diverse ethnic, educational and socioeconomic backgrounds (Fowler and Swenson, 1979). Two sets of studies were conducted on recent immigrants to Canada in the families' native language, one in Chinese, the other in Italian (Ns = 4 each). Few or only limited controls were employed in these preliminary studies. In all except the study with Chinese families first born infants were selected to optimize parent involvement and the ease of enriching child care.

Parents were guided in weekly-biweekly home visits, typically beginning before the child reached 6 months and continuing until the child was about a year old or slightly more. The methods employed, which had been developed in an earlier educational project in day care (Fowler, 1972), were presented to parents through informal

discussions, interactive demonstrations with their infants and in a program guide (Fowler, 1974), which has recently been expanded into a book (Fowler, 1990a) and illustrated in a videotape (Fowler, 1990b). The approach consisted of a number of principles, the central component of which was language mediated cognitive learning through adult-child interaction in sensory motor play with toys and common objects and in daily child care routines. The approach thus combined a cognitive referential learning strategy with a social interaction strategy, deliberately emphasizing two strategies of development which had been reported as dysfunctionally separate strands of development in some children (Nelson, 1973).

Following the large language and cognitive developmental advances, well beyond norms, in these pilot studies in all 15 children without exception (Fowler and Swenson, 1979) several dissertation were undertaken. Two of them are reported on in this paper, one by Ogston (1983) and the other by Swenson (1983), along with data from the pilot/case studies. (Because of the still very limited data available, the design and results in another early enrichment study on Afro-Carribean infants by Roberts, 1983, will be reported only briefly at the end of the discussion of follow-up findings.) Both the Ogston and Swenson studies employed randomized controls, used the same program methods and parent guide, and selected first borns from largely college-educated families with mostly non-working mothers. Swenson compared the effects of intensive language stimulation started in two groups at different age periods (3 versus 7 months). Ogston's design was to compare the effects on development of two types of early intensive stimulation, language and gross motor exercises, beginning at about age 3 months in both groups. (A special gross motor guide, based on Levy, 1973, was prepared for the exercise group.) Ogston's gross motor group had an N of 12, while her language group and both of Swenson's groups was 6. (The intent was to pool data from the two studies to compensate for the smaller Ns in the language groups dictated by cost considerations.)

Measures and Data Analyses

Several types of developmental measures were employed, ranging from standardized mental tests, one of which provided a multi-competence profile, including language (Griffiths, 1970) to language assessments scales (Bzoch & League, 1971), tape recordings and daily parent records of infant progress in sound, word and sentence acquisitions. Follow-up measures consisted of semi-structured interviews in person and by telephone and mail, and SAT measures administered through the usual school channels. The latter were selected because of convenience, wide standardization and low cost. (The follow-up is being conducted on a minimum budget.) Because of small Ns and the limited controls employed, analysis of data include many normative comparisons of development, in particular, comparisons with developmental test norms and actual outcomes versus expected probabilities for different indices of school achievement and competence. Data are both pooled across studies and analyzed by groups. Early program outcomes will be discussed briefly before discussing long-term outcomes at greater length.

## Early Development

What effects did the early language enrichment have on the development of these children from mainly college-educated families? Over the course of early development, during the 6 months to a year of the program itself to the ages of 16 to 18 months, and during the preschool period assessed in follow-ups at different points to 42 months, children in all projects progressed in language development well in advance of norms and by several measures significantly over their respective controls. The data reported in Table 1 draws on a number of measures, parent records, tape recordings and standardized test results.

Looking first at progress in vocabulary and phrase making development, recorded by parents during the program, children in every language stimulated group progressed in language development at faster rates and to higher levels than norms, as Table 1 shows. Moreover, every child in every language stimulated group gained substantially and the rates accelerated with development. As the ranges indicate, children ranged from 2 to 6 months ahead of norms in producing their first words to 4 to 11 months ahead of norms in first use of phrases.

While no similar records of progress in vocabulary and phrase development could be collected by parents of controls or of Ogston's (1983) motor group without compromising program goals, post-test assessments of Ogston's groups indicate that on phrase making and syntactical development (varieties of parts of speech used), language stimulated groups were significantly ahead of controls, and in phrase making also significantly ahead of the motor group. As will be noted, the motor stimulated group was next highest and the controls were lowest. In the Swenson (1983) study, only two parents of the six families reported children using any phrases at all by 16 to 18 months at post-testing.

---

Insert Table 1 about here

---

On the Griffiths' Scales mean language quotient (LQ) scores gains of Swenson's and Ogston's language groups of 18 to 24 points were significantly greater than controls in the Swenson study but not in the Ogston study. On the other hand, mean differences on the REEL Scales between Ogston's language stimulated group and controls at post-testing were significant. This discrepancy among outcomes on the different measures in the Ogston study was partly attributed by her from an item analysis to the lower sensitivity of the Griffiths Hearing and Speech Scale compared to other measures (REEL Scales and taping and parent report of language processes). The Griffiths does not incorporate as finely scaled indices of linguistic development as the other measures.

Mean Griffiths IQ scores (termed GQ) also increased for all groups, generally paralleling the pattern reported for levels and changes in language, but at slightly lower levels. Similar patterns appeared on the Griffiths Performance Scale which is appears to reflect problem solving skills. Statistical patterns were similar as well, significantly favoring the language groups over controls in the

Swenson study, but only for the motor group over controls in the Ogston study.

As expected, Ogston's motor stimulated group surpassed all groups in mean motor score gains, but the really interesting and unexpected finding, was the high language gains for this group, which actually reached a mean LQ on the Griffiths of 142 at post-testing. It became apparent that in order to guide their infants effectively in the exercises parents were using language very extensively, and in a very focused and interactive manner equivalent to the approach used in the language program itself, but here in the context of gross motor movement in place of sensory motor toy play.

Turning to the short term follow up, assessments of children from 24 to 42 months confirmed the high levels of language competence attained in all language stimulated groups. As may be seen in Table 1, mean lengths of utterance at 42 months in Swenson's Ss (only 1 S missing) ranged from 1.4 to 2.4 morphemes longer than the mean of 3.7 morphemes for equivalent middle class samples of Miller and Chapman (1981). Three case study children assessed at 24 months were advanced by 1.8 to 2.8 morphemes and all three of Ogston's groups had by 30 months attained mean LQs of on the REEL Scales of more than 140, though the language group still substantially exceeded the other groups and significantly exceeded the controls.

Mean Griffith LQ scores (not shown in Table 1) were elevated to 150 or more for all groups including controls, with mean IQ scores also remaining elevated at around 130 or more at somewhat lower levels. Similarly, both high LQ and IQ levels on the Griffiths or Binet, ranging from 124 to 160, were found in various selected follow-up assessments of case study children (N = 5 of 7) at 42 and 60 months.

It would seem that early language enrichment can regularly advance the language and general cognitive competencies of children through guiding parents in home stimulation programs. A strong complex verbal foundation of competencies was established in every child, and this advanced system of skills was generally maintained throughout the preschool years.

But how do we account for the unexpected follow-up advances of Ogston's control group, LQs of 156 on the Griffiths and 143 on the REEL Scales, respectively? At program termination, following post-testing, Ogston had provided feed back and guidance to control parents on the language stimulation program. This guidance included a written program guide. It seems likely that between post-testing and follow-up control parents had more systematically enriched their modes of adult-infant communication between 16 and 30 months than they had between 3 and 16 months. In fact at the follow-up 4 of the 6 control infants gained from 21 to 54 points and one gained 10 (the sixth declining by 10 points) on the Griffiths language scale and Ogston observed heightened parental stimulation in at least two of the families during the follow-up assessment. If this explanation is valid, it suggests a certain flexibility in the age of starting enriched stimulation, at least in these largely college educated families.

## Long-term Follow-up

It is thus evidently not difficult to generate excellent verbal and cognitive skills through enriching the language stimulation of children during their first years. But what of the later fate of these good starts? Did systematic progress in early development make any difference over the long course of development? In attempting to answer this question, we can present partial follow-up data from initial interviews with family members on 39 of 44 early stimulated children located between the ages of 13 and 18 years. (One additional case study child has been included.) The data are based on initial interviews: information is often incomplete, in competencies in social science/history and in developmental histories. As noted earlier, nearly all of these are professional or semi-professional families with at least partly college educated backgrounds. Note that Ogston's controls are now included as the "Older" group, given evident parent intensification of language stimulation at 16 months. No data are as yet available on Swenson's controls.

Table 2 shows the frequency and (for the combined N) percentages of students with superior skills in major aspects of competence. Perhaps most significant is that 24 (62%) of the 39 children are in special academic programs, that is, in gifted classes (17), in top academic schools that have no special gifted classes (2) or are accelerated in grade (5). From 30 to 32 (62 to 82%) of these high school students (2 now attending university) are similarly outstanding in various other ways: they have typically obtained A and B grades, are excellent and usually avid readers, and have competent writing skills. Over half (22) of the 39 students (56%) learned to read at some level before first grade, while 34 (87%) are skilled in writing, 22 (56%) of them writing creative material independently (stories, poetry or scripts).

---

Insert Table 2 about here

---

The vast majority are also highly adept at learning additional languages: 33 (85%) have learned French both easily and fluently. Four children are skilled in 3 languages, 3 in 4 and one is skilled in 5 languages. While the French immersion frequent in Canadian schools is certainly in part responsible, even given this context their second language learning and verbal memory skills are outstanding. A high proportion (36 or 92%) of these students are also strongly and independently motivated intellectually in such activities as reading, writing, math and science, computer, drama and debating. The relatively high proportion skilled in acting (16 or 41%), given its strong verbal and memory components is probably not surprising. But many also display strong skills in math (26 or 67%) and science (22 or 56%), underscoring how skill in the basic language code seems to transfer easily to math and other abstract domains of activity, earlier biographical studies have shown (Fowler, 1986). One of our cases scored at the 98th percentile on the verbal SATs and 97th percentile in math in grade 7 and was placed on the John Hopkins mailing list. Although she never pursued this option, she has

maintained an outstanding record in math. The relatively lower showing of students in the obviously heavily verbal field of social studies/history (15 or 38%) is mainly the result of incomplete information.

Most students also enjoy a broad variety of interests in the arts, including drama (16), music (19), and the visual arts (14), ranging from 36 to 49%. Many (26, or 67%) are highly active in sports, either team or individual, such as skiing or tennis. Note that these figures include only those who are definitely skilled in one or more sports, not simply those who are active and interested in sports. This diversity of interests, coupled with the 31 (79%) who are skilled in both peer and adult relations and the 27 (69%) having good leadership skills, underscores their generally well balanced development. Nearly all have enjoyed good health (38 or 97%), with only occasional illnesses and mild cases of asthma. Three cases have had learning disabilities, but one of these is in gifted classes and 2 of the 3 are skilled in writing (one in writing stories). One student who experienced substance abuse (now recovered) nevertheless writes poetry.

If we look at patterns among the different subgroups, the total Swenson group shows the most consistent levels of high ability. Ten of the 12 students have been in special academic programs, 11 have excellent grade records, all 12 are excellent readers and independently motivated, and 12 have good writing skills, 10 of them writing creative material independently, percentages ranging from 83 to 100. They are similarly consistently high skilled in learning second languages and in math, science, sports and social relations. Note that patterns are very similar for Swenson's younger and older starting groups, suggesting that it makes little apparent difference whether enrichment starts at 3 or 7 1/2 months.

Despite the smaller proportions in the Ogston and case study groups enrolled in special academic programs (50 & 60%) or highly skilled in math and science (36 to 60%), percentages in these two groups for verbal skills are not far from those in Swenson's total group. Percentages average 80 in the case study group and 77 to 91 in Ogston's total group for school grades, skills in reading, writing and learning second languages, and motivational independence for verbal-intellectual activities, compared to 83 to 100 for Swenson's total group. Although the Ogston and case study samples are not quite as diversified in the arts, they are generally not much below the others in social relations and sports (except the case study group in sports).

While subgroup samples are small to make firm comparisons, it may be noted that Ogston's 16 months later starting group (the original controls, whose early language program guidance not only started later but was more truncated) contributed disproportionately to the lower percentages. They were considerably lower than Ogston's other 2 groups and the case study group in percentages in almost every area. From enrollment in special programs, grade records and motivation to most verbal and other skills, including math and science skills, the arts, social skills and even sports, they range from only 20 to 60 per cent,

compared to percentages of 33 to 100 for the other 3 subgroups. The only exceptions are the low 20 percent for case study children in sports, most groups in dance, and the generally lower figure in social science/history because of incomplete information. And although 80% of Ogston's older group have learned one language easily through French immersion, none of them have learned more than one additional language.

Competence Profiles

Not all students in special programs had the same profile of competencies, of course. Various combinations of skills were evident, clustering in subgroups. Certain students who were not identified with gifted or other special programs, moreover, were nonetheless highly competent in several areas. In fact, as shown in Table 3, 7 cases were sufficiently competent in enough areas to suggest that they might also be effectively classified as "gifted," or the equivalent in several areas. That is, they were all skilled in writing (4 wrote creatively) and 6 were skilled in reading (4 were early readers) and 5 each were skilled in learning second languages (1 skilled in 2 second languages) and obtained generally excellent grades. One was also skilled in math, another in science. At this point, data available do not permit analysis of why they were not included in such programs, but not all schools had gifted or accelerated programs and one student, who was an excellent early reader (since age 4) and creative writer of poetry, had earlier flagged in school because of substance abuse problems.

---

Insert Table 3

---

Among the 24 gifted/special program students, a huge majority (20 or 83%) were multiply skilled in both verbal competencies and math and some natural science as well. All 20 were strong in math, and 18 of the 20 were skilled in science. Only 4 (17%) were multiply skilled in verbal areas, but less competent in both math and natural science (and one was strong in science alone). Clearly, the predominant profile of broad, general academic competence across areas is the general outcome for these early language enriched individuals. This generalized competence in abstract symbol manipulations, moreover, typically extends to mathematical types of codes. Verbal competencies with less strong math-science skills is by far a minority profile.

Most of the 20 verbal/math group were also creative writers (13) and many (11) were also early readers. A higher proportion of the creative writers were early readers (9 of the 13, or 69%) compared to the good but non-creative writers (3 of 7, or 43%). The pattern was similar for the other groups: among the non math/science group all 3 creative writers were early readers, while the single non-creative skilled writer was not an early reader. Among those not formally classified as gifted (2 of 3 creative writers were early readers but only 2 of 4 good, but non-creative writers were early readers.) Altogether, 14 (74%) of the total of 19 creative writers in these three different groups (verbal + math/science, verbal, and skilled

non-gifted) were early readers, compared to 5 of 11 (45%) of all the skilled, non-creative writers being early readers.

Note that 22 (73%) of the 30 skilled readers (of the 39 Ss) were early readers, as shown in Table 1, which lends weight to the sequential model of developmental dynamics proposed by the senior author (Fowler, 1981): rich early language prepares the ground for expanding interaction between verbally skilled, learning motivated children and verbally competent mentor/resource persons (mainly parents) that often leads to early reading. This in turn contributes to further independence in skill development interacting with the continued support of competent resource persons (both parents and teachers as the child enters school.

Gender Differences and Profiles

The analysis of gender differences is constrained by the imbalance in Ns. Twenty-five of the 39 S are girls, compared to only 14 boys, making gender differences between verbal and math skills, where they might be expected (Stanley, 1993), difficult to detect where such a high proportion (20 or 83%) of the gifted/accelerated were skilled in both domains. But in fact, as seen in Table 4, slight differences favoring boys in math, but not in science did emerge. Ten (71%) of the 14 boys were highly skilled in math, compared to 14 (56%) of the 25 girls. On the other hand, 15 (60%) of the girls excelled in science, compared to 7 (50%) of the boys, and one of the 4 less math skilled students was a girl skilled in natural science. These proportions do not seem to reflect the strong math and science difficulties often reported for girls.

---

Insert Table 4

---

Perhaps gender differences show up among verbal competencies, such as reading, early reading or creative writing, where they are sometimes reported, at least during the school years (Maccoby and Jacklin, 1974). These differences might show up first in the overall achievement patterns in the proportions represented among the gifted/accelerated. Sixteen (64%) of the girls are in special academic programs, compared to 8 (57%) of the boys, hardly a great difference. But looking across verbal skills, a consistent pattern of excellence favoring girls emerges, except for skill in learning second languages. More girls than boys are avid readers (100% versus 8 or 57%), were early readers (17 or 68% versus 4 or 29%), are creative writers (15 or 60% versus 7 or 50%) or non-creative skilled writers (9 or 36% versus 4 or 29%). And while proportions are very close in skill in learning second languages (2 or 88% versus 12 or 86%), 5 (20%) of the girls were skilled in at least 2 second languages, compared to 2 (14%) of the boys.

What about differences in the arts, sports and social skills? Here we find a mixed pattern. Higher proportions of girls than boys are found to be highly skilled in drama (40% versus 21%), music (56% versus 36%) and dance (24% versus 7%), as would perhaps be expected traditionally, but a higher proportion of boys is skilled in the visual arts (57% versus 32%), also supposedly a more common pursuit of

girls. And in sports, girls quite unexpectedly excel proportionately over boys by 84% to 50%. In social skills, relatively more girls than boys are skilled with their peers (88% to 64%), but boys are relatively more skilled in relations with adults (79% to 60%), but only slightly more skilled in taking leadership (71% to 64%). Perhaps the most interesting reversal of cultural stereotypes is the higher percentage of girls than boys who are independently motivated in intellectual type pursuits (96% to 71%). Part of the reason for this is the greater independence of girls over boys to engage in reading on their own. However, the demonstrated independence of girls in this study to write creatively on their own (60%), pursue dramatic acting successfully (40%), either in theatre or TV, actively engage in science projects (60% compared to 50% of the boys), show active interest at a high level in math (56%), and perform well musically (56%) suggests that their intellectual autonomy is not limited to the traditional solitary pursuit of reading.

Standard Achievement Test (SAT) Scores

The verbal and math SAT scores of 26 of the 39 follow-up subjects are reported in Table 5. The means of both sets of scores fall in the low 400s, representing mean percentiles of 56 and 42, both not far from the 50th percentile. It will be noted that standard deviations are quite large, in part the result of relatively low scores (200s and 300s) of several students, including one with learning disabilities and another with multiple problems reflected in past substance abuse, and relatively high scores (high 500s and one 610) of others.

---

Insert Table 5 here

---

Looking at the proportion of students who scored at relatively high levels, 65% scored at or above the 50th percentile level in the verbal test, whereas only 42 reached this level on the math test--which requires higher scores to attain this level. Fifty-four percent were at or above the 60th percentile on the verbal test and only 31 percent on the math test.

These are probably higher levels than the SAT percentile norms reflect, since the norms are based on the scores of college bound seniors (12th grade). Only one of our subjects had reached 12th grade and 12 (46%) were still in the 9th or 10th grades. Moreover, unlike the typical US test taker, SAT scores are not a criterion for college admission for Canadian students, unless applying to US colleges. Our Ss took the tests simply to accommodate the goals of the research.

At first glance it appeared that our follow-up subjects performed substantially better on the verbal test than they did on the math test, compared to norms, though math scores in fact ran a little higher ($\bar{X}$ of 444 for math versus 438 for verbal). A look at gender differences, however, suggests a different picture. It turns out that girls performed much better on the verbal tests than boys, while boys performed better on the math test. Girls are considerably higher in both mean verbal scores (459 to 405) and mean percentiles (63 to 44) and in the proportion scoring at higher levels (75% reached at least the 51st percentile). Boys are substantially higher in both mean math

scores (466 to 431) and mean math percentiles (46 to 38). Thus gender SAT score patterns tended to follow the same verbal versus math competence differences found in the other indices of competence.

It will be further noted in Table 5 that of the 15 students in special academic programs (i.e., defined as gifted) whose SAT scores have been received to date, many more of them scored equal to or above (10) than below (5) 500 on either the verbal or math test. (One scoring close to 500--490--is included in the equal to or above 500 count). In contrast, only 3 of the 11 students not in such programs scored equal to or above 500 on either test, while 8 did not.

Follow-up of Afro-Carribean Immigrant Children from limited Educational Backgrounds

Data presented on these subjects is extremely limited, both in the number of subjects assessed to date and the brevity of the initial interview.

The early enrichment program with these infants varied from that of the other entirely language focused programs (Roberts, 1981, 1983). Because of the lower parent educational levels and differences in cultural background and information on the lower levels of normative development expected, the program combined a strong language program with one involving guidance to parents in fostering problem solving skills appropriate for the current technological demands of a developed society. Mean years of parent schooling was only 8.8 years for the mothers and 9.5 year for the fathers. There was a total of 43 infants, matched by age and gender and randomly assigned among four groups, 11 for each of two experimental groups, a younger group whose 12 months program started at 4 months and an older group whose similar program started at 12 months, and two similarly aged control groups. Programs continued to the age of 18 months for both experimental groups.

During early development, both experimental groups scored at 120 to 130 IQ levels, compared to 90 to 100+ for the controls, on the Griffiths Scales (1970), which furnished measures of language, problem solving, fine and gross motor coordination and personal-social competence. Mean post-test experimental-control differences were significant on all key measures of language, problem-solving, fine motor coordination and GQ (IQ equivalent) compared to pretest scores, which ranged between 100 and 115 for all groups.

At the current follow-up of these Ss, now in 9th to 11th grades, the limited data on 6 experimental Ss (5 younger starting and 1 older starting) and 4 control Ss (2 younger and 2 older) indicate that the 5 younger experimentals are generally doing well in school and on several measures of competence, while the older experimental S and all four controls are doing much less well. Four of the 5 younger experimental Ss generally obtain A and B grades, one of them being in gifted classes, and the grades of the fifth range from A to C. All five are generally good readers, all except one reading independently out of school, and 4 of the 5 get A and B grades in math and 3 of them in science. All 5 are interested in some art form (3 in music and 2 in drawing). Three appear to be skilled socially, with information still lacking on the other two. Thus the 5 experimentals appear to be

coping well academically and displaying a good balance of academic, social and other skills, while all four controls and the older experimental S are not coping well except in sports (all 5) and 2 of them in vocational activities.

## Discussion

What are we to make of these findings? Do they really represent evidence that children's potentials are widely unrealized or are they in large part an artifact of limited methodology and accidents of chance? The data <u>are</u> tentative, based largely on preliminary interviews (by mail, phone, in person, or usually in combination) that do not yet include either systematic in depth evaluations of skills and achievements or accounts of developmental histories. Information is also based on pooling data from small samples with very limited controls, and only highly preliminary information from the Roberts' study. (Swenson's controls are also still to be located.)

There is, nonetheless, reason to believe the findings are more than accidental aberrations, if we compare the frequencies with which these individuals with largely college educated backgrounds attained gifted status with those found in the general population of individuals from the same background. According to an analysis by Humphreys (1985), using data from a study in Project Talent, we should expect to find no more than 4.8% of the population with similar background reaching gifted levels, while 62% of our adolescents are at that level. Humphrey's data are based on a US study of 40,000 9th grade boys, but it is highly unlikely that percentages would vary greatly for girls, for high school students, or for Canada. Giftedness for 18 (46%) of the Ss in our samples was based on school-diagnosed criteria for entry to gifted classes in the Ontario school system of at least 130 IQ on the WISC, which is a more demanding level than an equivalent on the Binet. The Wechsler correlates highly with the composite test used in the Humphrey's analysis. Two additional students were doing well in top academic schools considered to be the equivalent of gifted programs. Four others were assigned to the gifted category based on high scholastic records with grade acceleration, making a total of 62%. As noted in Table 3, moreover, there were 7 other students whose academic skills in writing, reading and school achievements indicated they might well be defined as close to gifted, noting that not all schools had gifted programs. It seems clear in any case that at least 50% and perhaps as many as 79% of the youth in our studies attained these ability levels, certain far beyond the 4.8% expected by chance.

It may be that the first born, and often only child status of most of the Ss raises the expected percentage of giftedness expected in the population (Fowler, 1975). The pattern is not entirely consistent (Ernst and Angst, 1983), however, and again the probability of the rate in this population coming anywhere near 62% seems remote.

If we look at Roberts' still limited follow-up study of students from Afro-Carribean immigrant backgrounds of generally less than high school education, we find one of the 6 Ss reported on to date in gifted classes or about 17%, compared to an expected level of about .001% for families from that educational background. Another S is

close to that level (WISC IQ 125), moreover, while none of the four controls come close, in fact generally doing quite poorly in school. We might also add to this group two subjects from the main body of Ss with parents from similar educational backgrounds, one of whom was in gifted classes. This makes 2 of 8 Ss or 25% of Ss having both parents with no more than a high school education who have attained gifted levels. Note that only 1 of 6 of Roberts' experimental Ss was not doing well in school, while all 4 of her controls were doing poorly.

One more indication of competence development that greatly exceeds norms is the 56% of Ss from largely college educated families who were early readers, compared to Durkin's (1966) study of more than 5000 first graders, among whom only 1% had been early readers. Even assuming that the expected rate would be higher in our selected population and current cultural era of Sesame Street, it seems doubtful that it would approach 56%.

Assuming then some validity in our findings, several things stand out on the relatively more complete data on Ss from largely college educated families. The first is the wide variety of our students' abilities and achievements. Twenty (51%) of the total sample of 39, and actually 85% of the gifted category of 24 Ss, are multiply highly skilled in verbal activities, including reading and writing and learning languages, and math and the natural sciences as well. Only 4 of the 24 were verbally skilled without being skilled in both science and math and one of these was skilled in science. Even among the 7 generally excellent, verbally skilled students, not formally classified as "gifted," one each of them was skilled in either science or math.

The general level of both the verbal and mathematical SAT scores bears out this pattern, with 65% of the subjects scoring on the verbal test at or above the 50th percentile and 54% scoring at or above the 60th percentile. Similarly, though somewhat lower, on the math test 42% scored at or above the 50th percentile and 31% scored at or above the 60th percentile. As noted earlier, these percentiles probably underestimate the score levels, because they are based on US college bound senior norms, while all except one of our Ss ranged from grade 9 to 11 and Canadian students have no college admission criterion incentive to take SATs. Girls tended to score much better on the verbal test and boys on the math test, following other indices of competence patterns but both made respectable showings in both domains.

Contrary to reports by a number of parents and teachers, and caveats by the SAT guide, however, French immersion types of bilingual education, a widespread practice in Canada, did not seem to materially affect SAT performances. French immersion involves teaching native English speaking children most subjects in French (except English), including math, over most of the elementary school years. Higher and lower scoring (above and below 500 on either the verbal or math test) students were distributed about equally between participants and non-participants in immersion. Nine high scorers had been in French immersion, as against 11 low scorers. Those not in French immersion were divided equally (3 each) between high and low scorers.

Since nearly all subjects from the study with largely college-educated families were quite skilled in one or another of the arts, 67% were well skilled in sports, almost 80% were socially skilled with adults and peers, almost 70% enjoy recognized leadership skills, and 92% were identified as independently motivated intellectually, it is evident that these children's development was for the most part extremely broad, encompassing the arts as well as all academic domains, and well balanced, founded in both social competence and enjoyment of skilled physical activities. This high level of social competence is in keeping with the advanced social skills traditionally reported for most gifted children (Janos and Robinson, 1985).

The 56% who write creatively, coupled with the 92% independently motivated intellectually further underscores that the bulk of these youths are not colorless academic drudges, but are intent on forming challenging and creative intellectual lives of their own. Both boys and girls developed more or less equally well, moreover, and though the traditional patterns of girls doing better in verbal skills and boys in math appeared, the proportions appeared less pronounced than usual, given the small apparent advantage of girls in natural science and the fact that both genders, for the most part, generally did well in math. The evidence that intensive early verbal stimulation seemed to play in the development of great mathematicians (Fowler, 1986), may be applicable here. The broad cognitive emphasis of the early language program may in fact have started girls as well as boys on the road to broad intellectual competence that prepared them motivationally as well as cognitively to move in any number of directions, including math and science. The findings in this research thus give support for language as an important root in developing abilities in a rather general form, across a number of domains, excluding perhaps only skills in specialized domains, such as music and other arts, and kinesthetically and spatially anchored skills. But even here there was a tendency for our Ss to extend their skills into these domains (e.g., sports, music and other arts) as well, possibly as much or more the result of the early intense motivation generated for learning of all kinds, however, rather than the direct result of mediation by language itself.

Tentatively, we may also say that Roberts' experimental subjects seem to be generally similarly well balanced and motivated, if not quite at the same level. It is important to note that Roberts' Ss were more often (57%) from multi-sibling (2 or more child) families, compared to the first born, single child status of the college educated group. We shall have to defer further comment on Roberts follow-up data until more detailed interviews are conducted on more subjects.

The second thing that stands out, at least for the children from advantaged families, is the extraordinary long range consequences of enriching children's development in infancy. The third is how powerful a role language seems to play in cognitive and social development. Six to 12 months of professionally guiding parents in enriching the language of their infants during the first year or two of development, has seemingly generated long lasting effects in

virtually all aspects of cognitive development at hardly foreseeable levels. And, the early enrichment was not only limited in time and scope, but was centered on language (though Roberts program involved problem solving skills as well). How can we account for this potency of language and the effects of earliness of focus?

Earlier scrutiny of case studies of bright children and the biographies of great intellectuals (Fowler, 1967, 1981, 1883) have suggested that intensive verbal stimulation, starting early in life is at the center of experiential factors contributing to high intellectual development. This may not be uniformly true of the development of intellectual brilliance in all fields, such as the visual arts and music (Fowler, 1983, Gardner, 1983), but is widely documented in the background of the great in fields heavily loaded with verbal skills, including math and the sciences (Fowler, 1986), as well as the obvious ones of literary and scholarly greatness (Fowler, 1983). A certain pattern of developmental dynamics appears to build on the early establishment of verbally anchored cognitive skills, which Fowler (1981) has synthesized from intensive study of some early case studies of Terman (1919). Although we have so far only sketchily documented the later experiences of our subjects, it would appear that the strong mastery of language fostered by the enriched language experiences during infancy set the stage for the potential realization of their generally exceptional later development.

In the first instance, the enrichment program was built on a highly cognitive focus, anchoring the language play in concrete activities that facilitated understanding of the means and ends of things. Language was simplified and presented in forms highly accessible and engaging to the child. Thus early development was advanced cognitively, as reflected in IQ scores and observations of the children's every day competencies, not in just language competencies alone. In the second instance, it was highly socially oriented, involving the child's interest and attention through social interaction, the adult and the infant taking turns, to enable the adult to furnish a framework that fostered autonomy in the child. Ogston (1983) found direct evidence that the parents whose children progressed the most tended to be those who practiced turn taking most consistently, and these same children appear to be among those with the most outstanding later development. Thus, these two aspects of a rich, cognitive strategy and flexible social interaction may to an important degree account for the combined high cognitive and strong social competence our subjects have shown in later development.

But how do we get from early mastery to continued high competence over the course of later development throughout the childhood of these advantaged children? As the early biographical studies and the still limited data on our own children suggest, It would appear that a strong early foundation is made up of both cognitive components, of which competence in language is key, and motivational components, of which good social skills and autonomy are central. Verbal mastery, when cognitively based, opens the door to representing, understanding and able negotiating with knowledgeable older persons to constantly expand one's knowledge and advance ones skills. The drive to

intellectual independence and autonomy in learning, moreover, fires this verbal cognitive apparatus to maintain itself and seek out knowledgeable resources of parents, teachers and written material to continually advance development. Here again, the role of language competence is central. Early exceptional verbal skills, especially when broadly based cognitively, apparently make the process of accessing knowledge in print--learning to read--an easy transition, as the 56% who were well launched by age 5 testifies. Moreover, except for one or two children with learning disabilities, almost all the others learned to read well easily, quickly and with enjoyment within a year or two of starting school. And this vital source of autonomous learning, once started, continued to expand throughout development, as indicated by the 77% of the students who are able and generally avid readers by the high school years.

Not to be overlooked is the social role the bright child plays in the culture of family and school life. Parents found their children's enriched skill development rewarding, from infancy on, as noted in the favorable comments of friends and in the "rational" responsiveness of the child to instruction and adapting to social rules of family life, as parents frequently remarked. Quite a number of parents commented on the important role the early enrichment had played in their child's development. At school, assignment to gifted classes, attaining consistently high grades, winning awards (e.g. invited to participate in a writer's conference in 6th grade, scoring at the 97th-98th percentiles in math and verbal SATs in 7th grade, winning science contests, selected for TV roles or debating team), and teacher praise were all marks of the reinforcing role of high competence.

Of special interest is the way the developmental dynamics shifts from close guidance by parents in the early years to that of a much more open role of resource person and mentor. While our data are still very limited in this regard, it is already quite evident that parents assumed an increasingly less directive role as the child's capabilities expand in verbal skills in communication, reading and project initiative and pursuit. The trajectory is apparently one of a increasingly self-propelled cognitive-motivational system that seeks intellectual, social, physical (sports) and often artistic novelty and challenge.

Do many--or any--of these children reach their full biological potential levels of cognitive and social competence? Who can say? All we can say is that guiding parents in the early enrichment in an ecology of parents and schools that seem prepared to support and aid the child to build on an enriched foundation of early mastery can apparently enable both boys and girls to develop, broadly and in a balanced manner, at higher levels and in greater numbers and percentages than norms based on currently cultural practices of cognitive socialization would predict.

## References


Bloom, B. S. (ed.) (1985) Developing Talent in Young People. New York: Ballantine.

Bzoch, K. R. and League, R. (1971) Receptive Expressive Emergent Language Scale. Tallahahasse, FL: Tree of Life Press.

Carew, J.V. (1980) Experience and the development of intelligence in young children at home and in day care. Monographs of the Society for Research in Child Development. 45, Serial no. 187.

Cazden, C. (1965) Environmental assistance to the child's acquisition of grammar. Unpublished Ph.D. dissertation, Harvard U.

Clarke-Stewart, A. (1973) Interactions between mothers and their young children: Characteristics and consequences. Monographs of the Society for Research in Child Development. 38, Serial no. 153.

Consortium for Longitudinal Studies. (1983) As the Twig is Bent. Hillsdale, NJ: Lawrence Erlbaum.

Drash, P.W. and Stolberg, A. L. (1977) Acceleration of cognitive, linguistic and social development in the normal infant. Tallahassee, FL: Florida State Department of Health and Rehabilitation Services. (ERIC Document Reproduction Service No. ED 145 938).

Drash, P.W. and Stolberg, A.L. (1979) Intellectual acceleration in normal and Down's Syndrome Children through infant stimulation and language training. Paper presented at the annual conference of the Southeastern Psychological Association. New Orleans, LA.

Durkin, D. (1966) Children Who Read Early: Two Longitudinal Studies. New York: Teachers College Press.

Ernst, C. and Angst, J. (1983) Birth Order: Its Influence on Personality. New York: Springer-Verlag.

Ervin, S. M. and Miller, W.R. (1963) Language development. In H.M. Stevenson (ed.) Child psychology: Yearbook of the National Society for the Study of Education: Part 2.

Fowler, W. (1967) Dimensions for environmental control of developmental learning in early childhood. Psychologia Wychowawcza, 10, 165-281, no. 3 & no. 4.

Fowler, W. (1972) A developmental learning approach to infant care in a group setting. Merrill-Palmer Quarterly, 18, 145-175.

Fowler, W. (1974) Language development stimulation program. Toronto: Ontario Institute for Studies in Education.

Fowler, W. (1975) How adult-child ratios influence infant development. Interchange, 6, 17-31.

Fowler, W. (1981) Case studies in cognitive precocity: The role of exogenous and endogenous stimulation in early mental development. Journal of Applied Developmental Psychology, 2, 319-367.

Fowler, W. (1983) Potentials of Childhood. Vol 1: A Historical View of Early Experience. Lexington, MA: Lexington Books.

Fowler, W. (1986) Early experiences of great men and women mathematicians. In Fowler, W. (ed.) Early Experience and the development of competence. New Directions in Child Development. No. 32. San Francisco: Jossey-Bass.

Fowler, W. (1990a) Early stimulation and the develoment of verbal talents. In M. J. A. Howe (ed.) Encouraging the development of Exceptional Skills and Talents. Leicester, UK: British Psychological Society.

Fowler, W. (1990b) Talking from Infancy: How to Nurture and Cultivate Early Language Development. Cambridge, MA: Brookline Books.

Fowler, W., Ogston, K., Roberts-Fiati, G., and Swenson, A. (in press) The influence of early language stimulation on the short and long term development of abilities: Identifying exceptional abilities through educational intervention. Paper presented at the 1992 Esther Katz Rosen Symposium on the Psychological Development of Gifted Children: Developmental Approaches to Identifying exceptional ability. (To be published in Proceedings by the American Psychological Association.)

Fowler, W., Ogston, K., Roberts-Fiati, G., and Swenson, A. (1993) Accelerating Language Acquisition. In K. Ackrill (ed.) The Origins and Development of High Ability. Chichester, UK: Wiley.

Fowler, W. and Swenson, A. (1979) The influence of early language stimulation on development. Genetic Psychology Monographs, 100, 73-109.

Gardner, H. (1983) Frames of Mind: The Theory of Multiple Intelligences. New York: Basic Books.

Griffiths, R. (1970) The Abilities of Young Children. London: Child Development Research Centre.

Hamilton, M.L. (1977) Social learning and the transition from babbling to words. Journal of Genetic Psychology, 130, 211-270.

Hart, B. and Risley, T. R. (1992) American parenting of language-learning children: Persisting differences in family-child interactions observed in natural home environments. Developmental Psychology, 28, 1096-1105.

Howe, M.J.A. (1990) The Origins of Exceptional Abilities. Oxford, UK: Blackwell.

Humphreys, L. G. (1985) A conceptualization of giftedness. In F. D. Horowitz and M. O'Brien (eds.) The Gifted and talented: Developmental Perspectives. Washington, DC: American Psychological Association.

Huttenlocher, J., Height, W. Bryk, A., Seltzer, M., and Lyons, T. (1991) Early vocabulary growth: Relation to language input and gender. Developmental Psychology, 27, 236-248.

Janos, P. M. and Robinson, N. M. (1985) Psychosocial development in intellectually gifted children. In F. D. Horowitz and M. O'Brien (eds.) The Gifted and Talented: Developmental Perspectives. Washington, DC: American Psychological Association.

Lazar, I. and Darlington, R. (1982) Lasting effects of early education: A report from the Consortium for Longitudinal Studies. Monographs of the Society for Research in Child Development, 47, Serial No. 195.

Levy, J. (1973) Exercises for Your Baby. London: Collins.

McCartney, K. (1984) Effect of quality day care environment on children's language development. Developmental Psychology, 20, 244-260.

Maccoby, E. E. and Jacklin, C. N. (1974) The Psychology of Sex Differences. Stanford, CA: Stanford University Press.

Metzl, (1980) Teaching parents a strategy for enhancing infant development. Child Development, 51, 583-586.

Miller, J. and Chapman, R. (1981) The relation between age and mean length of utterance in morphemes. Journal of Speech and Hearing Research, 24, 154-161.

Nelson, K. (1973) Structure and stratedy in learning to talk. Monographs of the Society for Research in Child Development. 38, Serial No. 149.

Nelson, K. (1977) Facilitating children's syntax acquisition. Developmental Psychology, 13, 101-107.

Ogston, K. (1983) The effects of gross motor and language stimulation on infant development. In W. Fowler (ed.) Potentials of Childhood. vol. 2. Lexington, MA: Lexington Books.

Rheingold, H. L., Gewirtz, J. L. and Ross, H.W. (1959) Social conditioning of vocalization in the infant. Journal of Comparative Physiological Psychology. 52, 68-73.

Roberts, G. (1983) The effects of a program of stimulation in language and problem solving on the development of infants from lower-income, black Carribean immigrant families. In W. Fowler (ed.) Potentials of Childhood vol. 2. Lexington, MA: Lexington Books.

Stanley, J.C. (1993) Mathematial Reasoning Ability. In K. Ackrill (ed.) The Origins and Development of High Ability. Chicester, UK and New York: Wiley.

Strayer, L.C. (1930) Language and growth: The relative efficacy of early and deferred vocabulary training, studied by the method of co-twin control. Genetic Psychology Monographs, 8, 209-317.

Swenson, A. (1983) Toward an ecological approach to theory and research in child language acquisition. In W. Fowler (ed.) Potentials of Childhood. vol. 2. Lexington, MA: Lexington Books.

Terman, L. M. (1919) The Intelligence of School Children. Boston: Houghton Mifflin.

Table 1

Indices of Accelerated Language Competence from Early Enrichment
At Program Termination and Short Term Follow-Up

| | Norm | Swenson Study | | | Ogston Study | | | Pilot[a] |
|---|---|---|---|---|---|---|---|---|
| Groups | | Yngr | Oldr | Cont | Lang | Mot | Oldr[b] | Studies |
| Ns | | 6 | 6 | 6 | 6 | 12 | 6 | 7 |
| Ages Started Program (mos) | | 2-4 | 6-8 | | 2-5 | 3 | 16 | 3-8 |
| **At Program Termination** | | | | | | | | |
| | | **Ages Attained (Ranges)** | | | | | | |
| Vocabulary | Norm | | | | | | | |
| 5+ | 13 | 8-11 | 9-11 | | 9-10 | | | 7-11 |
| 10-20 | 19 | 10-14 | 10-11 | | 10-13 | | | 9-11 |
| 1st Phrases (ranges) | | | | | | | | |
| 2-words | 21 | 10-13[c] | 15-17[d] | 16-18[e] | 10-15 | | | 12-13 |
| Phrases Used: | | | | | **Mean Posttest Scores[f]** | | | |
| Parent List | | | | | 4.1 | 3.1 | 1.3 | |
| Audiotaping | | | | | 7.2 | 3.4 | 3.3 | |
| Parts of Speech | | | | | **Per cent of Ss Using[f]** | | | |
| 5-10 Types | | | | | 83 | 67 | 50 | |
| 7-10 Types | | | | | 67 | 17 | 0 | |
| | | **Mean Language Quotient Scores[f]** | | | | | | |
| Griffiths-Pretest | 115 | 103 | 107 | | 117 | 127 | 127 | |
| -Posttest | 134 | 141 | 128 | | 135 | 142 | 133 | |
| REEL Scales[g] Posttest (Expressive) | | | | | 151 | 142 | 133 | |
| **At Short Term Follow-Up** | | | | | | | | |
| | | **No. of Morphemes (ranges)** | | | | | | |
| MLUs | Norm | | | | | | | |
| 24 months | 1.9 | | | | | | | 3.7-4.7[h] |
| 42 months | 3.7 | 5.1-6.1 | 5.3-6.1[d] | | | | | |
| REEL Scales[h] (30 months) | | | | | | | | |
| LQ[i] | 100 | | | | 158 | 147 | 143 | |

[a]Includes 3 and 4 Ss from first and second pilot studies, respectively.
[b]Originally, the randomized controls during period of program. Defined as "Older" language stimulation group, because of guidance offered at program termination. [c]Based on 4 Ss. [d]Based on 5 Ss.
[e]Based on 3 Ss; others were older before phrases started.
[f]All posttest and follow-up (but not pretest) differences indicated (except for Ogston's Griffiths scores) were significant in favor of language groups over controls, and also over Ogston's motor group for phrases used.
[g]Bzoch & League, 1970. [h]Based on 3 Ss.

Table 2

Skill Patterns of Early Language Stimulated Children[a] at Long Term Follow Up During Late Adolescence (Ages 13 to 18):

Number Highly Rated Ss in Each Category

| Groups | Swenson Study Yngr | Oldr | Tot | Ogston Study Lang | Mot | Oldr[b] | Tot | Case Studies[c] | All f | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Ages Started Early Stim. Program | 2-4 | 6-8 | | 2-5 | 3 | 16 | | 3-8 | | |
| Ns | 6/6 | 6/6 | 12/12 | 5/6 | 12/12 | 5/6 | 22/24 | 5/8 | 39/44 | |
| Schooling | | | | | | | | | | |
| Spec Acad Prog[d] | 6 | 4 | 10 | 3 | 6 | 2 | 11 | 3 | 24 | 62 |
| A-B Grades | 6 | 5 | 11 | 5 | 10 | 2 | 17 | 4 | 32 | 82 |
| Indep. Motiv. | 6 | 6 | 12 | 5 | 12 | 3 | 20 | 4 | 36 | 92 |
| Verbal Skills | | | | | | | | | | |
| Reading | 6 | 6 | 12 | 5 | 11 | 3 | 19 | 4 | 30 | 77 |
| Read-Presch | 3 | 4 | 7 | 2 | 9 | 1 | 12 | 3 | 22 | 56 |
| Writes-Well | 6 | 6 | 12 | 5 | 11 | 2 | 18 | 4 | 34 | 87 |
| -Creatively | 4 | 6 | 10 | 1 | 8 | 1 | 10 | 2 | 22 | 56 |
| 2nd Languages | 4 | 6 | 10 | 5 | 10 | 4 | 19 | 4 | 33 | 85 |
| Drama | 2 | 4 | 6 | 2 | 4 | 1 | 7 | 3 | 16 | 41 |
| Hist/SocSci | 3 | | 3 | 3 | 3 | 1 | 7 | 5 | 15 | 38 |
| Math | 6 | 5 | 11 | 5 | 5 | 2 | 12 | 3 | 26 | 67 |
| Science | 6 | 5 | 11 | 2 | 6 | | 8 | 3 | 22 | 56 |
| Arts | | | | | | | | | | |
| Music | 3 | 3 | 6 | 3 | 6 | 1 | 10 | 3 | 19 | 49 |
| Visual | 2 | 4 | 6 | 3 | 4 | 1 | 8 | | 14 | 36 |
| Dance | | 2 | 2 | | 4 | | 4 | | 6 | 15 |
| Sports | 5 | 5 | 10 | 4 | 10 | 1 | 15 | 1 | 26 | 67 |
| Good Health | 6 | 6 | 12 | 4 | 12 | 5 | 21 | 5 | 38 | 97 |
| Social Skills | | | | | | | | | | |
| With Peers | 6 | 5 | 11 | 5 | 9 | 1 | 15 | 5 | 31 | 79 |
| With Adults | 5 | 6 | 11 | 5 | 8 | 2 | 15 | 5 | 31 | 79 |
| Leadership | 2 | 5 | 7 | 4 | 9 | 2 | 15 | 5 | 27 | 69 |

[a] Largely from at least partly college-educated families; includes a few with one or two parents with high school education or less.

[b] Ss of Ogston's original control group whose parents were guided on early language stimulation at the time of project termination.

[c] Includes 3 Ss from first pilot study, 4 Ss from student seminar projects and 1 additional case study (bilingual) of Swenson.

[d] In special academic programs: in gifted classes (18), highly academic schools (2) or advanced in grade (4).

Table 3

*Competence Profiles of High Competence Among Follow-up Cases of Early Language Stimulated Children*

| | In Special Academic Programs (N = 24) | | | | Not in Special Academic Programs[a] (N = 7) | |
|---|---|---|---|---|---|---|
| | High Verbal, Math & Science Skills[b] (N = 20) | | High Verbal Skills[c] (N = 4) | | | |
| | Creative Writers (N = 13) | Non-Creative Writers (N = 7) | Creative Writers (N = 3) | Non-Creative Writers (N = 1) | Creat. Writers (N = 3) | Non-Creat. Writers (N = 4) |
| | f % | f % | f % | f % | f % | f % |
| Preschool Readers | 9 69 | 3 43 | 3 100 | 0 0 | 2 67 | 2 50 |

Totals of Early Readers Among:

| | f | % |
|---|---|---|
| Creative Writers: | 14 | 74 |
| Non-Creative Writers: | 5 | 45 |

---

[a]Skills included: All 7 were skilled in writing, 6 were skilled readers (4 early readers), 5 each obtained high grades and were skilled in learning 2nd languages (1 in knowing two 2nd languages), and one was skilled in math and another in science.

[b]All 20 were high in all verbal skills (reading, writing, learning 2nd languages) and math, while 18 of 20 were skilled in science.

[c]One S was also competent in science, but not in math.

Table 4

Profiles of Gender Difference

Frequency and Percent of Indices of High Competence among All Girls and Boys

| | Girls | | Boys | |
|---|---|---|---|---|
| | f | % | f | % |
| Total Ns | 25 | 64 | 14 | 36 |
| Gifted/Accelerated | 16 | 64 | 8 | 57 |
| A-B Grades | 22 | 88 | 10 | 71 |
| Independent Intellect. Motiv. | 24 | 96 | 10 | 71 |
| Verbal Skills | | | | |
| Readers | 25 | 100 | 8 | 57 |
| Early Readers | 17 | 68 | 4 | 29 |
| Writers | | | | |
| Creative | 15 | 60 | 7 | 50 |
| General | 9 | 36 | 4 | 29 |
| Combined | 24 | 96 | 11 | 79 |
| 2nd Languages | | | | |
| One | 17 | 68 | 10 | 71 |
| Two or more | 5 | 20 | 2 | 14 |
| Combined | 22 | 88 | 12 | 86 |
| Math | 14 | 56 | 10 | 71 |
| Natural Science | 15 | 60 | 7 | 50 |
| Arts | | | | |
| Drama/TV Roles | 10 | 40 | 3 | 21 |
| Music | 14 | 56 | 5 | 36 |
| Visual Arts | 8 | 32 | 8 | 57 |
| Dance | 6 | 24 | 1 | 7 |
| Sports | 21 | 84 | 7 | 50 |
| Social Skills | | | | |
| With Peers | 22 | 88 | 9 | 64 |
| With Adults | 15 | 60 | 11 | 79 |
| Leadership | 16 | 64 | 10 | 71 |

Table 5

Verbal and Math SAT Score Patterns of Follow-up Children Taking Test at Grades 9, 10, 11 or 12

Mean Scores, Standard Deviations and Mean Percentiles

| | Total Group | | | | Girls | | | | Boys | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | X | SD | Perc.[a] (X) | N | X | SD | Perc. (X) | N | X | SD | Perc. (X) |
| Verbal | 26 | 438 | 86 | 56 | 16 | 459 | 77 | 63 | 10 | 405 | 88 | 44 |
| Math | 26 | 444 | 91 | 42 | 16 | 431 | 98 | 38 | 10 | 466 | 72 | 46 |

Subject Frequencies and Percents at Higher Score Levels

| | Total Group (N = 26) | | | Girls (N = 16) | | | Boys (N = 10) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Perc. | f | % | Perc. | f | % | Perc. | f | % |
| **Verbal Scores** | | | | | | | | | |
| >550 | >86 | 3 | 12 | 87 | 2 | 12 | 85 | 1 | 10 |
| >500 | >75 | 7 | 27 | 76 | 6 | 37 | 73 | 1 | 10 |
| >450 | >60 | 14 | 54 | 61 | 10 | 63 | 58 | 4 | 40 |
| >420 | >50 | 17 | 65 | 51 | 12 | 75 | 48 | 5 | 50 |
| **Math Scores** | | | | | | | | | |
| >550 | >71 | 4 | 15 | 77 | 3 | 19 | 63 | 2 | 20 |
| >510 | >60 | 8 | 31 | 67 | 5 | 31 | 53 | 3 | 30 |
| >470 | >49 | 11 | 42 | 56 | 7 | 44 | 42 | 5 | 50 |

Frequencies and Percents of Ss In and Not In Special Academic Programs Scoring Above and Below 500 on Either Test

| | > 500 | | <500 | |
|---|---|---|---|---|
| | f | % | f | % |
| In Special Academic Programs | 10 | 67 | 5 | 33 |
| Not in Special Academic Programs | 3 | 27 | 8 | 73 |

[a]Percentiles

# SCHOLASTIC APTITUDE TEST (SAT) SCORE PATTERNS

## GIFTED, NON-GIFTED, AND COMBINED GROUPS

| | GIFTED (N=18) | NON-GIFTED (N=14) | COMBINED (N=32) |
|---|---|---|---|
| VERBAL TEST | | | |
| Mean Scores | 475 | 406 | 437 |
| SDs | 92 | 70 | 113 |
| Percentiles | 68 | 44 | 55 |
| MATHEMATICS TEST | | | |
| Mean Scores | 487 | 405 | 451 |
| SDs | 95 | 80 | 97 |
| Percentiles | 71 | 31 | 43 |
| TEST OF STANDARD WRITTEN ENGLISH (TSWE) | | | |
| Mean Scores | 51 | 40 | 46 |
| SDs | 8 | 10 | 11 |
| Percentiles | 73 | 39 | 57 |

NOTE: On all three measures,

| | | |
|---|---|---|
| Gifted group | = | near the 70th percentile |
| Non-gifted group | = | 31st to 44th percentiles |
| Combined group | = | falls in between |

## GENDER DIFFERENCES IN SAT SCORES

| | GIFTED GROUP[a] | |
|---|---|---|
| | GIRLS (N=11) | BOYS (N=7) |
| VERBAL TEST | | |
| Mean Scores | 481 | 466 |
| SDs | 75 | 113 |
| Percentiles | 71 | 63 |
| MATHEMATICS TEST | | |
| Mean Scores | 466 | 520 |
| SDs | 77 | 110 |
| Percentiles | 55 | 55 |
| TEST OF STANDARD WRITTEN ENGLISH (TSWE) | | |
| Mean Scores | 51 | 49 |
| SDs | 8 | 9 |
| Percentiles | 73 | 67 |

NOTE: SAT gender patterns follow verbal-math differences found on other measures.

| | | | |
|---|---|---|---|
| On Verbal Tests (SAT & TSWE) | Girls | > | Boys |
| On the Mathematics Test | Boys | > | Girls |

However,

On the Mathematics Test, though mean scores favor boys, percentiles are identical.

[a] Non-gifted group gender patterns are similar, though at lower levels.

## Ss FROM AFRO-CARIBBEAN IMMIGRANT FAMILIES WITH LIMITED EDUCATION

Ages 15 to 16
In High School[a]

### INDICES OF COMPETENCE FOR EXPERIMENTAL AND CONTROL SUBJECTS

| | NUMBER OF Ss | |
|---|---|---|
| | EXPERIMENTAL (N=6) | CONTROL (N=4) |
| Doing Well in School<br>Getting A-B Grades<br>Independent Readers | 5 | 0 |
| In Gifted Classes[b] | 1 | 0 |
| Creative Writer | 1 | 0 |

[a] Preliminary information from initial interview.

[b] One additional Experimental S has advanced standing and a third comes close to gifted (125 IQ on WISC, vs. 130 for school criterion).